Space Weather Forecast

Issued on Monday 16 December 2024 at 13:19 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: A chance of Minor/Moderate (R1/R2) Radio Blackouts becoming likely by Day 3 (18 Dec).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate following an impulsive Moderate flare at 15/2024 UTC from a sunspot region in the northwest disc. There are currently five sunspot regions on the Earth-facing disc with the area in the southwest disc, the largest and most complex region. The remaining regions on the disc are smaller and more magnetically simple.

A filament (arc of the Sun's material) lift-off was observed around 15/0400 UTC in the southwest disc. A faint 'partial halo' Coronal Mass Ejection (CME) was faintly evident in solar imagery. This CME brings a possible glancing blow to Earth.

Solar Wind / Geomagnetic Activity: The solar wind speeds showed a gradual slowing of the solar wind from slightly elevated to slow-ambient as the connection to an area of fast-winds declines. Solar wind speeds peaked at 450km/s from around 15/2000 UTC falling to 390 km/s from 16/0800 UTC. The Interplanetary Magnetic Field (IMF), was weak at first, before becoming moderate between 15/2100 to 16/0600 UTC, after which it became weak again. The north-south component, oscillated between northward and southwards, but generally favoured a weakly southward direction. The net result of the above solar wind measures was for Quiet to Unsettled geomagnetic activity (Kp1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate Solar activity is expected with a chance of Moderate flares on Days 1 and 2 (16 and 17 Dec). Moderate flares then becoming likely by Day 3 (18 Dec). There is a slight chance of isolated Strong flares throughout.

Solar Wind / Geomagnetic Activity: A Coronal Mass Ejection (CME) that left the Sun on 15 Dec may see a glancing blow to Earth on Days 3 and 4. Otherwise a declining connection to the fast-wind of a coronal hole is expected to see solar wind speeds ease from slightly elevated to slow-ambient levels between Days 1 and 2 (16 and 17 Dec), with no further fast-wind enhancements expected during the period.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Geomagnetic activity is expected to be mainly Quiet to Unsettled, with a slight chance of isolated Active intervals between Days 1-2 (17-18 Dec). Any influence from the CME that left the Sun on the 15 Dec may see geomagnetic activity increase, with periods of Unsettled to Active and a slight chance of G1/Minor Storms from Day 3 (18 Dec).

Energetic Particles / Solar Radiation: There is a daily slight chance of S1/Minor solar radiation storms or greater, in response to any notable flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	45	50	55	60
Very Active	R3-R5 (X Class)	No	5	5	5	10

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.